



## ***Comments of Hanford Challenge***

### ***Plutonium and Cesium Cleanup on Hanford's Central Plateau***

#### **Background:**

Hanford is a 586 square mile nuclear waste site in southeastern Washington. Hanford's contamination is a remnant of WWII and Cold War plutonium production for atomic weapons. The U.S. taxpayer has spent an estimated \$5.5 trillion to produce its nuclear arsenal, according to the Brookings Institute.<sup>1</sup>

This comment is in response to the Department Of Energy's (DOE) [proposal](#) that outlines the cleanup options for 22 waste sites that are within the boundaries of 4 "operable units" in the 200 area of the Hanford Site. The operable units are called PW – 1, 3, and 6 and CW-5. The 22 waste sites are grouped into 6 waste groups based on the type of liquid waste they received. The proposal shows different options for cleaning up these waste sites and the preferences of DOE's favorites. These options are listed by waste group.

The draft "Proposed Plan for the Remediation of the 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units" (Draft Plan) discusses the proposed remediation of 22 waste sites within the 200 Area of the Central Plateau. The 200-PW-3 Operable Unit (Cesium Sites) includes four Plutonium Uranium Extraction Plant cribs and one unplanned release, all containing primarily cesium-137 in the 200 East Area.

The contamination came from liquid waste that was generated during plutonium production in various buildings on the Central Plateau. The contamination contains both plutonium and radioactive cesium. Plutonium-239 has a half-life of 24,100 years, and will be dangerous for 240,000 years. Cesium-137 has a half-life of 30 years, and will be dangerous for 300 years.

Hanford Challenge is concerned about the health dangers of plutonium and cesium, both of which present health concerns when people are exposed to these elements, even in microscopic quantities. As for plutonium-239, a quarter of a million years may as well be

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<sup>1</sup> *Atomic Audit, The Costs and Consequences of U.S. Nuclear Weapons Since 1940*, Stephen I. Schwartz, Brookings Institution Press, 1998.

“forever.” We need to ensure that future generations are protected from these contaminants. Picking the most protective cleanup option and putting the contamination in a location that is isolated from the biosphere is the only ethical and defensible option. For a point of reference, what is now known as the Hanford Site was under 200 feet of water resulting from glacial flooding 14,000 years ago. These incidents of glacial flooding are historical events that have occurred hundreds of times in the past hundreds of thousands of years. We therefore can fully anticipate that within the foreseeable future, an episode of glacial flooding will occur again, likely mobilizing whatever contaminants remain on the Hanford site. The U.S. Geological Service [website](#) states,

“The glacial lake, at its maximum height and extent, contained more than 500 cubic miles of water. When Glacial Lake Missoula burst through the ice dam and exploded downstream, it did so at a rate 10 times the combined flow of all the rivers of the world. This towering mass of water and ice literally shook the ground as it thundered towards the Pacific Ocean, stripping away thick soils and cutting deep canyons in the underlying bedrock. With flood waters roaring across the landscape at speeds approaching 65 miles per hour, the lake would have drained in as little as 48 hours.”

DOE’s Proposal Outlines the Following Cleanup Options:

**No Action:** *Leave the waste where it lies. Do nothing.*

**Maintain and Enhance the Existing Soil Cover:** *Add more soil and plants. Landscape the top of the waste site.*

**Engineered Safety Barrier:** *Leave the contamination where it is, but with a barrier of basalt rock at least 15ft deep separating the contaminated soil from the surface soil.*

**In Situ Vitrification:** *Melt the contaminated soil together with glass and put it back in the ground and cover it with clean soil.*

**Removal Treatment and Disposal (RTD):** *Remove a portion of the waste\*, treat it when necessary, and dispose of it at either Hanford’s Environmental Restoration Disposal Facility, which is a large lined landfill on the Central Plateau, or send it to New Mexico’s Waste Isolation Pilot Project where deep salt caverns are used to store plutonium contaminated waste. Removing a portion of the waste is defined in the 4 following ways:*

- *removal of the top 2ft of contaminated soil,*
- *removal of the top 15ft of contaminated soil,*
- *removing soil until a certain concentration of the plutonium is gone,*
- *removing soil with concentrations resulting in a direct contact risk greater than a one cancer per one thousand exposure risk level.*

DOE’s Preferred Alternative:

**Z-Ditches:** *Remove, Treat and Dispose (RTD) of waste and dispose of it at Hanford’s lined landfill (ERDF).*

**High-Salt:** Remove, Treat and Dispose (RTD) 2ft of contaminated soil and send it to New Mexico's salt caverns at WIPP.

**Low-Salt:** Remove, Treat and Dispose (RTD) what DOE estimates will be 90% of the plutonium and send it to New Mexico's salt caverns at WIPP.

**Cesium-137:** Maintain and Enhance the Existing Soil Cover, expensive landscaping.

**Settling Tanks:** Remove, Treat and Dispose (RTD) of sludge from the tanks send to WIPP or ERDF depending on what they find. Stabilize the tanks.

**Pipelines:** Remove, Treat and Dispose (RTD) Dig them up and assess the soil underneath the pipes to see if they have leaked.

## **DOE's Preferred Alternative Scenario Would:**

*Leave more than 50% of the plutonium in the soil.*

*Leave the Cesium and put a dirt cap over the sites containing Cesium.*

### Hanford Challenge Comments

Hanford Challenge disagrees with the preferred alternatives chosen by DOE. At the public hearings on these matters, agency representatives attempted to assure the public that these sites would be safeguarded for "as long as the plutonium is dangerous." It is a considerable stretch to base a cleanup decision based upon the predicted institutional presence for a period exceeding one hundred years, and downright ludicrous to postulate a governmental presence for thousands of years. A quarter of a million years ago, there were no humans on the planet. Language itself is a few thousand years old.

The goals of this cleanup are sometimes difficult to understand. On the one hand, making Hanford safe for future generations is obviously important, but it seems like short term monetary concerns and time constraints get in the way of truly cleaning up Hanford. It may be a lot easier to dump the nuclear waste in a ditch on site, and for some of the waste that will probably be fine. But with waste like plutonium, which will in all likelihood outlive any man made safety features, a different solution, like moving it to the Waste Isolation Pilot Project, should be given a higher priority, even if it is more expensive.

Hanford Challenge urges the government to remove, treat and dispose of as much of the plutonium and cesium contamination as possible contained in the 21 burial grounds, regardless of how deep the contamination is found.

Hanford Challenge is a member of the Hanford Advisory Board, and as such agrees with and supports the advice to the Department of Energy as stated in its [June 3, 2011 letter](#) to the Department, which states on pages 2 and 3:

#### "Advice

- The Board advises the U.S. Department of Energy (DOE) to get as much plutonium out of these waste sites as possible.

- The Board advises DOE to implement a RTD policy for plutonium that emphasizes remediation of plutonium disposal sites. DOE policy should opt to ship eligible plutonium-contaminated soil to WIPP for geological disposal, permanently removing it from Hanford.
- The Board advises DOE to utilize a RTD approach when a high concentration of a radionuclide exists. This approach is consistent with established Board values.
- The Board advises basing remedial design for cleanup of technetium and nitrates upon increased characterization. Extensive sampling is needed to determine the location and extent of technetium and nitrate contamination. This characterization should coincide with remediation efforts.
- The Board advises a policy to conduct RTD concurrently with vapor extraction efforts to ensure meeting Tri-Party Agreement milestones.
- The Board advises the proximity of cesium-137 to the surface necessitates implementing an RTD approach in order to dispose of cesium into the ERDF burial ground.
- The Board advises the Tri-Party agencies to hold public meetings to discuss the draft "Proposed Plan for the Remediation of the 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units."

Hanford Challenge adopts and repeats these sound pieces of advice as our own, and incorporates this advice into our comments.

Sincerely yours,



Tom Carpenter, Executive Director  
Hanford Challenge  
September 6, 2011